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13. ABSTRACT ***(Maximum 200 Words)***

Fort Huachuca will soon use energy from the sun to help power a small portion of the southern Arizona military post, using renewable-energy technologies enhanced at Sandia National Laboratories in partnership with industry.

A prototype dish-Stirling solar system, which consists of a large dish of solar concentrators and a Stirling heat engine, will be installed at Fort Huachuca in July and should be in operation about two weeks later. The system will provide 7 kilowatts (kW) of electricity, or about 1 percent of the electricity currently used to power the Joint Interoperability Test Command's (JITC) main testing building, which has 93,000 square feet. The JITC tests and evaluates electronic equipment for the various branches of the military, other federal agencies, state and local governments, and private industry to ensure they use similar operating systems and conform to certain specifications. The work is done for the Department of Defense and Defense Information Systems Agency (DISA).

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News Release

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June xx, 1995

Fort Huachuca to Benefit from New Solar Technology

Dish-Stirling System Couples Solar Power with Engine to Generate Electricity

Albuquerque, N.M. – Fort Huachuca will soon use energy from the sun to help power a small portion of the southern Arizona military post, using renewable-energy technologies enhanced at Sandia National Laboratories in partnership with industry.

A prototype dish-Stirling solar system, which consists of a large dish of solar concentrators and a Stirling heat engine, will be installed at Fort Huachuca in July and should be in operation about two weeks later. The system will provide 7 kilowatts (kW) of electricity, or about 1 percent of the electricity currently used to power the Joint Interoperability Test Command's (JITC) main testing building, which has 93,000 square feet. The JITC tests and evaluates electronic equipment for the various branches of the military, other federal agencies, state and local governments, and private industry to ensure they use similar operating systems and conform to certain specifications. The work is done for the Department of Defense and Defense Information Systems Agency (DISA).

Field operation of the dish-Stirling system will help to determine its effectiveness and potential for commercialization on the world market and at other military posts. The system is intended to help generate or supplement electrical power in remote areas.

The project is funded by the Department of Defense Strategic Environmental Research and Development Program (SERDP), which supports renewable energy systems for military installations. The program is designed to ensure communications security between all branches of the military and to comply with a federal mandate to reduce energy use by all its agencies. SERDP provided $900,000 for the Fort Huachuca project.

The dish-Stirling solar electric system is being developed as a joint venture of the Department of Energy's solar program at Sandia National Laboratories and Cummins Engine Company, a leading manufacturer of diesel engines and generators. Current work on the system focuses on increasing its efficiency while bringing down its price.

Dish-Stirling systems have achieved a net conversion efficiency of 29 percent, a record for a solar system. Solar system efficiency is defined as the percentage of available sunlight converted to usable energy. Dish-Stirling systems eventually are expected to produce electricity at a cost comparable to conventional generating technologies. The dish-Stirling already is cost-competitive in remote markets, where electricity frequency costs 30 to 60 cents per kilowatt-hour.

The dish-Stirling system is named for its two major components: dish-shaped solar concentrators and a Stirling heat engine. The concentrators focus the sun's heat onto a receiver, which collects and transfers it to the engine. The engine is a sealed system filled with gas, and as the gas heats and cools, its pressure rises and falls. The change in pressure is controlled to make the pistons inside the engine move, producing mechanical power. The mechanical power in turn drives a generator and makes electricity.

Fort Huachuca was chosen for the project following a survey of military installations by Sandia's Solar Thermal Design Assistance Center. The Department of Defense's Tri-Service Renewable Energy Committee makes the final decision on site selections. The committee chose Fort Huachuca because of the amount of solar radiation it receives, its elevation, proximity to Mexico, and because the fort pays more than the DOD average for electricity.

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Fort Huachuca also has already made an effort to conserve energy and use alternative energy sources under the direction of post energy coordinator Bill Stein. Fort Huachuca currently uses solar power to heat water, preheat water for a pool, and for lighting various signs and streets.

"We've been looking for leading edge technologies in renewable energy for the post and the dish-Stirling system looks as if it has definite potential," Stein said.

Added David Menicucci of Sandia's Solar Thermal Technology Department: "Fort Huachuca is a very good test case – it gets lots of sunshine, it's very visible throughout the military, and it's close to Mexico, a potential big market."

In remote areas, a single dish-Stirling module can provide enough power to pump water or provide power to a remote village or hotel site. Individual modules can stand alone, or hundreds of them can be connected in a grid to produce a large power plant. The systems can be used to power signals at railroad crossings or navigational aids to boats offshore. And like other forms of solar energy, dish-Stirling solar thermal systems they do not produce pollution.

An added advantage of the system is its versatility: when the sun doesn't shine, the engine can be heated with an auxiliary fuel such as natural gas, propane, or heating oil. The system is equipped with a microcomputer that calculates the sun's position and keeps the system focused on the sun.

Sandia is a multiprogram Department of Energy laboratory, operated by a subsidiary of Lockheed Martin Corporation. With facilities located in Albuquerque, N.M. and Livermore Calif., Sandia has major R&D responsibilities in national defense, energy, environmental technologies, and economic competitiveness.

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